Vol. V. No. 23. November 5, 1908.

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

PROFESSOR DEWEY'S PRAGMATISM

THE following pages will form one chapter, "Le cas Dewey," of a book which is to be published in Paris, next winter, in F. Alcan's *Bibliothèque de philosophie contemporaine,* under the title "Antipragmatisme." What the writer means by "antipragmatism" will be seen in the forthcoming volume. At present, it will suffice to state that the extract printed below belongs to the end of the first part, where the chief theories of pragmatism are examined from a critical standpoint. This study of Professor Dewey's views had just been completed when he published his review of Wm. James's "Pragmatism" in this JOURNAL of February 13, 1908. It is in many ways an admirable criticism; but as Professor Dewey's own conception of pragmatism remains the same as before, nothing needs to be changed in the following pages.

Among the representatives of pragmatism in America, there is one whose position is not very clearly defined. Pragmatists have good reasons to claim him as being one of them, while he himself has good reason for keeping somewhat on the defensive. He has reiterated his hesitations once more in his criticism of James's book.[1] The "Dewey case" is interesting and characteristic. It is worth while to devote one chapter to a close examination of it.

Dewey is not exactly obscure, but from a French point of view, at least, he is certainly neither simple nor easy. I have wondered, at times, whether the endless windings of his philosophical thought have not contributed much to gain for him the enviable reputation of being "the most scientific" representative of pragmatism. In studying more closely his theories, one understands that Dewey hesitates—whether consciously or unconsciously I would not venture to say—between two ways of thinking which fundamentally contradict each other, and that he devotes a great part of his strength to conciliate them; thus the real meaning of his "tours, détours, et retours" becomes apparent.

[1] *Loc. cit.* See especially p. 96.

There is very distinctly at the bottom of his speculations a preoccupation similar to that which one finds in his brothers in pragmatism; namely, to bring nearer ethics and scientific truths on the domain of logic. The title of his long and famous essay, "Logical Conditions of a Scientific Treatment of Morality" (Chicago, 1903), is a complete program by itself. Only, instead of demonstrating that moral judgments have the same characteristics as the scientific judgments (as one would have expected, and as every one else would have done, it seems, who wanted to show that moral judgments can really be "scientifically treated"), Dewey chooses to do just the reverse: the first part of his essay is destined to show that scientific judgments have the characteristics of the moral judgments.

His conception of the "moral judgment"—which might, perhaps, sound somewhat old-fashioned to some of us—is the one he finds prevailing all around him in the Anglo-Saxon world, namely:

1. Moral judgments are individual, *i. e.*, aim at solving particular cases, and since each case is individual, the value of those judgments is absolute, not relative; as opposed to scientific judgments, which are usually considered as being universal, *i. e.*, good to solve not only individual cases, but any other similar cases: in science there are universal cases, people think, but not in ethics. Now, says Dewey (anxious, I repeat it, not to reduce moral judgments to scientific judgments, but, on the contrary, scientific judgments to moral judgments), this is erroneous. A scientist is looking for general laws, it is true; but at the same time he wants to solve individual cases or problems; laws are not science, but only a means to get science; and if a law does not solve a specific problem, the scientist will change the law and not the problem. Thus science, like ethics, aims at the individual case.

2. As applied to practical life, moral judgments imply the intervention of the personality of the one who judges, as one factor in the judgment. And here again, scientific judgments, if one only studies them closely enough, are like moral judgments; they imply a personal intervention, or action, on the part of the one who judges, (*a*) in the classification of possible predicates, (*b*) in the selection of the individual cases to be studied to solve a problem, (*c*) in the choice of the means for verifying an hypothesis, either by experience or by demonstration. In those three operations the personality of the judger, or, as Dewey says, his "character," modifies the judgment, guides, suggests. Thus: "If the use of scientific resources, of technique of observation and experiment, of systems of classification, etc., in directing the act of judging (and thereby fixing the content of the judgment), depends upon the interest and disposition of the judger, we have only to make such dependence explicit, and the

so-called scientific judgment appears definitely as a moral judgment" (p. 14).[2]

All this can be expressed in the following formula: the so-called scientific judgments, or purely objective judgments, being an abstraction without real existence, it is not possible to speak of scientific judgments which have not at the same time the characters of the moral judgments. Or, still more briefly: scientific judgments exist only as moral judgments. And the conclusion would be: since scientific judgments have the fundamental characters of moral judgments—aim at individual cases and imply the intervention of personality—moral judgments are as good, *as scientific,* as scientific judgments.

So far the spirit is altogether the same as the one prevailing in James and Schiller: man can not *not be* subjective in his judgments and opinions. Thus, if his moral judgments are subjective, they are worth as much as his scientific judgments (which latter are as a matter of course scientific). Only the way of expressing things is more scholastic with Dewey.

But once this point has been reached, the ground becomes slippery; for there is only a short distance to go before one feels like saying, Since the subjective element really *creates* our judgments (scientific or moral), since it is the unavoidable condition of judgment, it is *therefore* indispensable, and it is *therefore* the really important element. And then, one takes still another step: but then the moral judgment, in which the subjective element is more marked, as a matter of fact, than in the scientific judgment, ought, *therefore,* in case of conflict or hesitation, to be considered superior to the scientific judgment. There is the explanation of Schiller's paradox, that in case one has absolutely to choose between irrationalism and intellectualism, the first shall have the preference with the pragmatist.[3] Those arguments are obviously false.[4] Scientific judgments are, perhaps, all subjective, but it does not follow that they will be better for it. To maintain that subjectivism being unavoidable is indispensable, and thus, that the more there will be of it, the better for our judgments, holds still less. *But* all this is "indispensable" for pragmatism, which proposes to confer upon man the right to choose or to give out what truth shall be according to what is opportune, instead of simply ascertaining it.

[2] Except when otherwise stated, we quote from the essay on "Logical Conditions of a Scientific Treatment of Morality" (Chicago, 1903). I add that the complete and somewhat subtle demonstration which has just been summarized in order to render clearer the following pages, will be found on p. 9 ff. and p. 26.

[3] "Humanism," p. 5.

[4] This is discussed in detail in the first chapter of "Antipragmatisme."

To come back now to Dewey: as far as I have summarized his paper he has not decided yet for pragmatism; he has only reduced scientific judgments to moral judgments, thus the logic of science to the logic of ethics. But will he stay there? It seems that he ought to: for, to reduce the logic of science to the logic of ethics, or the logic of ethics to the logic of science, is it not practically the same? Is not, in both cases, the logic of ethics incorporated into the logic of science? It seems that the only thing that remains to do, for a logician in the strict sense of the word, would be to show that this subjectivism, pointed out by Dewey in scientific and moral judgments, does not impair their value, because (one must be well aware of the fact) scientific and moral judgments can be equally bad, as well as equally good.

But Dewey does not care about that. Consciously or unconsciously, he ignores this big question. He has something else in view. Let it be recalled once more that the title of his essay is "Logical Conditions of a Scientific Treatment of Morality." From the wording of this title we must infer that in his mind there exist *special* logical conditions for ethics (or "morality"—I confess that the reason for the selection of this word is not clear to me), for nobody would dream of writing about special logical conditions for physics or chemistry. There are, of course, in each domain of science, special conditions for scientific researches, but no special "logical" conditions. Dewey, therefore—in view of a purpose which he does not render clear—does not wish to affirm logical *identity* between scientific and moral judgments, but only *equivalence* in value. In fact, he is going to follow in the steps of pragmatists like James and Schiller: after having made great efforts to bring nearer together science and ethics (or morality), he is going to devote his efforts now to drawing a sharp distinction between them. Only, he is more clever, or more cautious, than, for example, Schiller; he is not going to risk and claim a *superiority* of moral judgments over scientific judgments, for this drives one to a corner, namely, that the irrational —or a-rational—is superior to the rational; moreover, the argument of Schiller is altogether too easily seen through. No, when Dewey crosses the Rubicon in his turn, he will cross it elsewhere; taking it for granted that he has proved the equivalence, he will claim further nothing more but the *independence* of moral judgments with regard to scientific judgments.

This cleverness, however, will not go a very long way. Thanks to a bold trip to logic, Schiller had gotten rid of the latter and run away; he was now free. But Dewey, who conscientiously refuses to part company with logic—a praiseworthy attempt, after all—will soon find out that logic is stronger than he is, and that the dangerous

partner whom he has chosen is simply going to prevent him from ever reaching his goal: a morality which is logically independent from science. He will finally do exactly the reverse of what he intended, namely, he will reduce the logic of ethics to the logic of science.

This is the way he establishes a difference between the two logics: While the intrusion of the personal element (or "character") is without practical results in the scientific judgments, in the moral judgments, on the contrary, this personal element "qualitatively colors the meaning of the situation"; it has an actual bearing on conduct; a moral judgment is almost an act. Thus, thinks Dewey, since, owing to circumstances, the personal element = zero in the scientific judgments, it is useless, "logically" speaking, to take it into account, while it is impossible to ignore it in moral judgments when we know it to be a fact that it does play an important part: "Character as a practical condition becomes *logical* when its influence is preferential in effect—when instead of being a uniform and impartial condition of any judgment it is, if left to itself (or unstated), a determinant of *this* content-value of judgment rather than that" (p. 161).

Is not all this rather extraordinary? If subjectivism (or "character") = zero, logically, in the scientific judgments, what is the meaning of those long pages and elaborate arguments of the first half of the essay in order to prove that subjectivism *is* there and *acts* in the same manner as in the moral judgments?

One of two things must be true: Either Dewey means to say that in the moral judgments there is something which is not to be found in the scientific judgments, namely, subjectivism: but, in this case, he flatly contradicts himself, since the first part of his essay is written to prove that there *is* subjectivism in the scientific judgments as well as in the moral judgments. He tells us now that when the action of "character" (or of subjectivism) becomes "preferential" in its effect, then the judgment *by this fact* becomes logical. But what then? As this action of character is not "preferential" in the scientific judgment, have we to believe that the scientific judgment is, perhaps, no longer "logical"? Unless one means to make fun of logic, such affirmations can not be taken seriously.

Or Dewey means to say that there is a minimum of subjectivism in scientific judgments, while the proportion is simply greater in moral judgments: but then we have to deal with a mere difference in quantity, not in quality, not a difference in the nature of the judgment; if the action of the "character" is simply more complex in the moral judgments than in the scientific judgments, this is not enough to differentiate them "logically." And then moral judg-

ments are reduced to scientific judgments.—One must choose.

Now, on the other hand, Dewey can not choose the second alternative, since he started with the idea of proving the opposite. On the other hand, Dewey can not *not* choose the second alternative, since he speaks of "logical conditions of a scientific treatment of morality"; unless one adopts in ethics the same logic which is adopted in science, one can not speak of a "scientific" treatment of morality.

Dewey has finally accepted the second alternative—and he sticks to it. The second half of his essay, therefore, contradicts the first; as was to be expected. Here is his definition of "character"—everything depends on this definition: "The term 'character' denotes this complex continuum of interactions [*i. e.,* interactions of natural dispositions, of technique, of knowledge, of habits of thought, etc.] in its office of influencing final judgment" (p. 14). This plainly indicates that for Dewey "character" is an effect before being a cause, a product (determined by considerations concerning the future as well as by circumstances in the past), and which acts only as a product strictly determined; "character" can be treated "logically" in the same sense as any factor in any scientific judgment. All attempts to differentiate between moral and scientific judgments are doomed to failure after that.

To convince ourselves that such is really the point of view adopted by Dewey in the end, we need only summarize the end of his essay. It is true that here and there the author seems to hesitate in developing his ideas: it is the pleading of a determinist, who is embarrassed by free-will reminiscences. Dewey, at times, even takes advantage of terms having a double meaning; especially when he considers the "scientific treatment" as serving "to control the formation of judgment" (p. 14). "To control" may mean to interfere in an active fashion, independently of the scientific factors taken into consideration; or it may mean simply that, knowing the factors which may enter into the determination, *i. e.,* being conscious of them, this consciousness only adds a new factor (just as determined as the others) in the formation of the judgment. Dewey proves the second sense to be true, *but then* speaks as if he had demonstrated the first. It seems clear, therefore, to one who judges from the spirit and not from the letter, that Dewey, in his conception of morality, finally adopts the traditional scientific conception of judgment.

He wants to prove this: That an ethical judgment "effects an absolutely reciprocal determination of the situation judged, and of the character or disposition which is expressed in the act of judging" (p. 17).

To appreciate, or to form, or to control, moral judgments, three conditions are required: (1) One must classify them, (2) one must know exactly the *psychological conditions,* the "character" of the judger, and also know (3) the *social conditions* in which the judgment takes place, "the situation judged."

(1) To *classify,* Dewey wishes to define clearly the domain of ethics; he proposes to have a sort of system of ethical "categories" corresponding to the categories of time, space, matter, etc., in physics. One must, for instance, agree on the meaning of the term "moral standard," whether it has any connection with happiness, or with the ideal of perfection; thanks to this we might then discuss profitably questions of ideal, of obligation, of responsibility, and of others. The writer confesses that he does not see very well the bearing of such theoretical discussions. What does Dewey exactly mean with those categories anyway? Does he wish, after all, to persuade us that there remains somewhere an essential difference between the logic of science and that of morality; or does he simply mean to point out the fact that the domain of moral researches is different from that of physics, for example, or other sciences? In the second case, it is rather useless to write a chapter to prove so evident a thing; in the first case, those "logical" connections between ethics and science, which precisely he wanted to bring out, are not made clear. The only example offered, that of the "moral standard," gives no light; one does not see whether he speaks of an absolute and imperative standard, or of a relative and changing one. If the "absolute" standard is meant, where does it come from? is it metaphysical? is it the old "moral sense"? But, then, what is the use of a "scientific" treatment of morality? Psychological factors and social factors can not affect it in the least. And if the "relative" standard is meant, if the standard depends on the *milieu* and on character as determined by contingencies, how can we define the "category" of standard otherwise than by the mere attribute of existence? Then, here again, we have a very superfluous chapter. One thing seems clear to me in all this: Dewey wants to bring ethics nearer to physical sciences, to prevent arbitrariness in definitions and concepts; in short, to confer upon ethics the logical qualities of natural sciences. But "categories" are useless for that purpose; even in physics, the categories of space, time, matter, are of secondary importance. No professor of physics, as far as we know, discusses them as an indispensable introduction to his special subject. They are questions pertaining to the theory of knowledge, or, possibly, to psychology, rather than to physics. In the same manner "moral categories" would have only a distant relation with ethics, even if conceived as scientifically as physics.

If not conceived in this way, things may be different; but then the parallelism between moral categories and scientific categories, which Dewey has in mind, exists no longer.

(2) Dewey's demonstration becomes much more satisfactory when he deals with the *psychological conditions* of moral judgment. The intrinsic logic of his premises prevents him from going astray: "Since character is a fact entering into any moral judgment passed, ability of control depends upon our power to state character in terms of generic relation of conditions, which conditions are detachable from the pressure of circumstance in the particular case. Psychological analysis is the instrument by which character is transformed from its absorption in the values of immediate experience into an objective, scientific, fact. It is, indeed, a statement of experience in terms of its modes of control of its own evolving" (p. 19). Thus, if we isolate by analysis the factor of "character," we are able to show that it is determined in its essence, and determined also in its determination, *i. e.,* in its manner of judging. We can not conceive of it in any other way. Dewey even proposes to make an "inventory" of the manners in which the different psychological dispositions do influence our judgment; and the results thus obtained "if true at all, have exactly the same logical validity that is possessed by any 'physical law' " (p. 20).

If, after that—be it that he does not realize the consequences of his premises or be it that he does not want to see them—Dewey declares that this analysis applied to experience allows us to "control" judgments "instead of merely indulging in them" (p. 21), this is of no importance; we have pointed out above the double meaning of the term "to control." Supposing that Dewey take it here in the sense of active intervention, independently of the scientific conditions in judgment, nobody else will be deceived by this amphibology after the words which we have just quoted from Dewey's own demonstration. Again, if Dewey claims that, while psychology shows to us that the moral judgment is determined by contingencies, psychology tells us *nothing* of the *content* of the moral ideal, nor that "consequently there must be recourse to transcendental considerations—to metaphysics" (p. 21), this alters in no way the scientific problem: the idea of an ideal may be a factor, to be sure, but it becomes one only after it has entered the scientific or psychological net of actions and interactions. Moreover, how would it be possible to conciliate this appeal to metaphysics with the following words, a few lines further down: "There is no question here of ideal as immediately experienced. Only living, not metaphysics any more than psychology, can 'give' an ideal in this sense" (p. 22).

(3) *Sociological conditions.* "Character," we have just seen, can be scientifically defined by us, therefore it must be scientifically determined. Now this factor of character, Dewey goes on to say, combines in an "absolute reciprocal determination" with the factor of the "situation judged"; and the scientific and determined nature of the latter is even more evident than that of character. To bring about a good moral judgment what do we need? In reply, Dewey says: "A social science which will analyze a content as a combination of elements in the same way that psychological analysis determines an act as a set of attitudes" (p. 23). It is, moreover, impossible to observe very strictly the distinction between psychological and sociological conditions, because the social influences here taken into consideration come into action only in as far as they influence the judger, *i. e.,* in as far as they become psychological. Dewey, therefore, wishes here only to emphasize what he calls the "continuity of the scientific judgments," namely, the interaction of social, biological, physical, etc., phenomena when they bear upon the moral judgment. "Any scene of action which is social is *also* cosmic or physical. It is also biological. Hence the absolute impossibility of ruling out the physical and biological sciences from bearing upon ethical science. If ethical theory require, as one of its necessary conditions, ability to describe in terms of itself the situation which demands moral judgment, any proposition, whether of mechanics, chemistry, geography, physiology, or history, which facilitates and guarantees the adequacy and truth of the description, becomes in virtue of that fact an important auxiliary of ethical science" (p. 24). Dewey opposes this conception to that of materialists and of transcendentalists. Materialists, like those described there, exist no longer, so we may ignore them. Transcendentalists are more interesting for us. It has been shown that in discussing the psychological conditions of moral judgments Dewey still hesitated whether or not metaphysics had to be given up altogether. This time he no longer hesitates: "The fact that advance of physical and biological science so profoundly modifies moral problems, and hence moral judgments, and hence once more moral values, may serve as an argument against transcendental ethics—since, according to the latter, such obvious facts would be impossibilities" (p. 24).

Where now, in all this, is there any room left for a pragmatic element? where the thinnest crack by which it might slip in? Since a moral judgment is the result of an "absolutely reciprocal determination" of the judger and of the situation judged, the moral ideal itself is only a product of this combination and must vary from epoch to epoch; and in its variations it depends strictly upon

the circumstances in which the judger happens to be with regard to the situation judged. A metaphysical ideal which would not be determined in the scientific sense of the word, is both impossible and useless; there is no room for it. The moral ideal is brought about "naturally" by the combination of the two above-mentioned factors; the ideal of to-morrow will be formed necessarily from the ideal of to-day. Now, if I become conscious of this mechanism, I may see where the ethics of to-morrow is aiming, and I may favor (or thwart) its course; but in this very action of favoring (or thwarting), the element of "reciprocal determination," which can be scientifically foreseen, is far from lacking.

If the method proposed by Dewey is conscientiously applied, the results reached will be the same as those of Lévy-Bruhl in his "La morale et la science des mœurs," he himself following in the steps of Durkheim's "Méthode sociologique." It is not a matter of mere chance if on both sides of the Atlantic, and without seeming to know of each other, those men agree so well on a theory which precludes pragmatism. Is it not as if one were reading Dewey—only in a style more direct, more transparent—when one comes across these words of Lévy-Bruhl: "La conception nouvelle des rapports de la pratique et de la théorie morale implique qu'il y a une réalité sociale objective, comme il y a une réalité physique objective, et que l'homme, s'il est raisonnable, doit se comporter à l'égard de la première comme de l'autre, c'est à dire s'efforcer d'en connaître les lois pour s'en rendre maître autant qu'il lui sera possible."[5]

Only Lévy-Bruhl is more determined, more conscious of the bearing of his method: "D'une façon générale, notre conception de la nature s'agrandit et s'enrichit chaque fois qu'une portion de la réalité qui nous est donnée dans l'expérience se 'désubjective' pour 's'objectiver.'"[6] Just like Dewey, Lévy-Bruhl wants to complete the psychological analysis of the judger by the sociological analysis of the situation judged: "Au lieu d'interpréter les phénomènes sociaux du passé à l'aide de la psychologie courante, ce serait au contraire la connaissance scientifique—c'est à dire sociologique—de ces phénomènes qui nous procurerait peu à peu une psychologie plus conforme à la diversité réelle de l'humanité présente et passée."[7]

[5] "La morale et la science des mœurs," 2d ed., p. 24.

[6] *Ibid.*, p. 29.

[7] *Ibid.*, p. 79. There are even certain concessions to popular moral conceptions which can be found in Lévy-Bruhl as well as in Dewey. Thus, when the first says: "De même que nous avons de presque toute la réalité donnée dans l'espace deux représentations parfaitement distinctes, l'une sensible et subjective, l'autre conceptuelle et objective; de même que le monde des sons et des couleurs est aussi l'objet de la science physique, . . . de même nous pouvons

Everywhere Lévy-Bruhl very plainly expresses his theories and his results, when with Dewey the reader constantly feels caution. The first frankly states: "Une science ne peut être normative en tant que théorique" (p. 14). And what the second wanted so much to show was that a science *can* be normative while theoretical; but the power of logic finally carried him one way, though his intention was evidently the other way. Read his note to page 13 (there are very interesting statements sometimes in Dewey's notes!) in which, after his attempt to reduce scientific judgments to moral judgments, or, in other words, the theoretical judgments to normative or pragmatic judgments, he refuses "to draw sharp lines between philosophy [*his* philosophy] as merely normative and the sciences as merely descriptive." Why does he refuse? Is it because he sees the inevitable consequences?

We are now in a position to understand the fundamental difference between James and Dewey in the problem under consideration; both start with the same end in view, which is to shake off intellectualism; both, again, when they examine conscientiously the problem, are forced, as they want to remain logical, to adapt their pragmatic theories to the requirements of reason. *But* James proves specially anxious not to lose sight of the end which he had proposed to his speculations, and more anxious to save the practical results than to offer a mere philosophical argument; thus, he remains true to the flag of pragmatism. Dewey, on the contrary, proves especially anxious to offer a fine and smooth argument, and thus allows himself to be driven away by his speculations from the purpose he had at first in view; he finds himself, at the end, to be the defender of a theory exactly opposite to that which he had intended to prove: and this just because he is the more conscientious of the two.

From this point of view, therefore, people are right enough when they maintain that Dewey is the most philosophical mind among the leading pragmatists, only, his philosophy is at the expense of his pragmatism.

It is well known that Peirce found himself caught in the same difficulty. He has admitted it, and the famous passage in Baldwin's *Dictionary* has been often quoted, in which he refuses to go all the

posséder en même temps deux représentations de la réalité morale, l'une subjective, l'autre objective" (p. 31). Such a concession is useless as long as we deal in a scientific manner with our topic. (Lévy-Bruhl had already adopted the distinction in his first book.) The conception of a *morale conditionnelle* introduced by A. Naville in the discussion (*Revue philosophique*, December, 1906) suffices to clear the field, and allows us once for all to ignore popular conceptions of ethics in science. I may add that the distinction made by Lévy-Bruhl does not side-track the discussion at all in his work.

way with too buoyant disciples. One ought now to compare Peirce's statement with a curious note of Dewey's—another case where a very significant statement is relegated to a foot-note: "The point of view which is here presented is, of course, distinctly pragmatic. I am not quite sure, however, of the implications of certain forms of pragmatism. They sometimes seem to imply that a rational or logical statement is all right up to a certain point, but has fixed external limits, so that at critical points recourse must be had to considerations which are distinctly of an irrational or extra-logical order. . . . It is just the opposite which I am endeavoring to sustain, *viz.* . . . " (p. 10). Yes, of course. There is the dilemma precisely: James sees well enough—without heralding it too loud—that in following logic to the end, there is no pragmatism left, and in order to be allowed to remain a pragmatist, it is necessary, at one certain point—to jump.[8] While Dewey, who obstinately persists in remaining true to logic, keeps of pragmatism nothing but the word, and lands in the *science des mœurs.*

ALBERT SCHINZ.

BRYN MAWR COLLEGE.

INFINITY AND THE GENERALIZATION OF THE CONCEPT OF NUMBER

IT is not very often that the student of philosophy has occasion to wander afar in the country of the mathematician, or that the mathematician is moved to follow the paths pioneered by the philosopher. Sometimes, however, the lack of definite boundaries suggests to each a more careful investigation of the other's habitat; for example, when the notion of infinity is under consideration. Here we should have not a trysting-place, but a battlefield, were it not for the fact that the underbrush hides the scouts from each other's sight, making it possible for the philosophers to report a treacherous and difficult pass, where the mathematicians, examining the same country, behold a clear and unobstructed roadway. Occasionally a straggler falls in with the other party and returns to oppose his report to that of his fellows, as gotten from new vantage-ground. This Professor Royce has done in taking over the mathematical concept of infinity to philosophy, and Mr. Bertrand Russell,

[8] "Materialism and agnosticism [read simply 'determinism'] even were they true, could never gain universal and popular acceptance, for they both, alike, give a solution of things which is irrational to the practical third of our nature" ("Will to Believe," p. 126). *Even were they true:* a man who would really believe in the possibility of proving logically that they are *not true,* would not have recourse to such hypothetical argumentation.

in formulating paradoxes arising from the infinite with philosophical dialectic. To the present writer, who has frequently been a sojourner with the mathematicians, it seems to be an important problem to determine what the facts really are, and, as preliminary to the task, he sets himself the problem of studying the mathematicians' report and examining the use that is, and that can be, legitimately made of it. In the question of interpretation, mathematics is especially open to error, for, from the nature of the case, its methods are preeminently suited to generalization, but are weak when it is a question of discovering subtleties of implication.

In all mathematical writings two sorts of infinities are distinguished, the cardinal and the ordinal infinite. This latter, however, need not concern us, as it aims directly at the definition of a certain kind of order in which the elements of certain classes may be put, while we are interested in the nature of the class or system itself, without reference to the order of its elements. The definition of the cardinal infinite is supposed to give us what we require.

To quote at once the classic definition: "A system S is called 'infinite' when it is similar (*i. e.,* can be put in one-one correspondence) with a proper part of itself; in the contrary case S is called a 'finite' system."[1] At first sight it seems as if nothing could be clearer than this definition, and it is generally assumed to be irreproachable. Unfortunately, in its applications it is not always so, and this will soon appear.

One great virtue of modern mathematics is that it consciously aims at avoiding self-contradictions and recognizes that the only possible proof of consistency lies in showing something existent to which its definitions and postulates apply, *i. e.,* something real, or at least imaginable, with respect to which we can interpret the definitions, or do all the things indicated by the postulates. This criterion is easily applied when geometry is in question, and it must also be applied to the definition of infinity. Consequently, we find with Dedekind: "Theorem: Infinite systems exist. Proof: My own realm of thoughts (*Gedankenwelt*); *i. e.,* the totality S of all things that can be objects of my thought, is infinite. For if s is an element of S, it follows that the thought s, *viz.,* the thought that S can be an object of my thought, is itself an element of S." Professor Royce[2] suggests the case of a perfect map of England drawn on the surface of England as a demonstration of this sort. The class of whole numbers and of the points on a line has also been used. It is admitted that all these cases make appeal to a principle of complete induction, but this principle is probably grounded in logical intuition and its

[1] Dedekind, "Was sind und was sollen die Zahlen," p. 17.

[2] "The World and the Individual," Vol. I., p. 503.

validity can hardly be called in question. Accordingly, mathematicians, and sympathizing philosophers, are satisfied that the existence of an actually infinite class has been shown.

But in what sense? The thought collection is never realized, the maps are never completed, the numbers and points are never put into one-one correspondence with a part of themselves. Nor do we mean to imply any quibble concerning time. From a practical point of view a finite class may be easily indicated such that a temporal correlating of it with some other finite class could not be actually carried to an end. But it would be absurd to introduce such considerations here. The important thing is that, logically, an essentially uncompleted process is implied in the definition of an infinite class, for if there is any point at which a next and, as yet, untaken step is not defined the collection would thereby become not infinite, but finite. All that we have, then, is a certain type of open process, and certain classes admitting of a correlating process of this type. We have not even advanced far beyond Locke's conception when he says: "For, as our idea of infinity being as I think, *an endless growing idea,* but the idea of any quantity the mind has, being at that time *terminated* in that idea, . . . to join infinity to it, is to adjust a standing measure to a growing bulk; and therefore I think it is not an insignificant subtlety, if I say, that we are careful to distinguish between the idea of the infinity of space and the idea of a space infinite." In exactly Locke's sense, the only infinity defined as consistent, and therefore existing for the mathematician, is the "infinity of a system" and not "a system infinite." Also the characteristic of such classes is that they are not "static," but "dynamic," that is, in them new elements are always bubbling up. The infinity of a class demands a genuine growth in Locke's sense, for this is the significance of the open correlating process whereby infinity is defined. Satisfaction of the definition implies merely that the class possesses what might be termed an unlimited power of spontaneous self-generation.

Had the mathematician been willing to take his definition in this sense, there would have been nothing of which we could complain. To say that a class or system of things submits to a certain correlating process of subcollections of its elements with the whole, is to posit a property of the class, and this property may be taken as the essence of the class of classes that possess it, and this class contrasted with the class of classes that do not possess it. It is to be noted, however, that this opposed class, the finite, is only defined negatively; and there is danger when we begin to transfer properties from one to another in a pair of logically opposite classes, for a property may have a connotative accompaniment, essential in the one, but not

transferable to the other. This is what the mathematicians have neglected to consider. We shall find that, because the cardinal number is defined through a correlating process in the field of the finite, and because correlating processes also have meaning in the region of the infinite, or transfinite, they have carried over the definition of the cardinal number, without considering that it might make a difference that the correlation, on the one side, implied a closed process and the presence of all the elements, and, on the other side, an open process and unlimited pregnancy with new elements.

Cantor[3] has expressed the belief that "mathematics is completely free in its development, and has only to pay attention to the self-evident condition that its conceptions are both free from self-contradiction and, in determinate relation, fixed by definitions, to the conceptions already present and verified. In particular, with the introduction of new numbers, it has only to give definitions of them by which such a definiteness, and, under circumstances, such a relation to the older numbers, are afforded that they can be distinguished from one another in given cases." There are many qualifying phrases here, but it is interesting to see how the task is carried out. Let us examine, in the case of cardinal numbers, the operations of making a transition from the finite to the infinite.

First, something about the finite cardinals. Two classes are said to be equivalent when they can be brought in one-one correspondence, and a class of such equivalent classes is said to be their cardinal number. That is, cardinal number connotes a way of establishing a one-one correspondence between classes of a particular sort, which amounts, practically, to the common-sense notion that it expresses the result of counting them. But with the finite numbers, the connotation is also involved that the elements are all there, and the process complete. Therefore, of two different cardinal numbers, it will happen that one can be called less than the other, when its process is insufficient to correlate the elements of the class of which it is the cardinal number with the elements of another class than which it is said to be less. In a similar fashion, addition appears by the superposition of one process on another which has been completed, and the definition of the result as the outcome of a new process, such that those classes of which it is the cardinal number may be called equal to the sum of the original classes.

For the finite numbers this is simple enough, and to Cantor's mind the extension to the transfinite involves no difficulty. Just as the finite cardinal number gives the type of certain classes, so there can be a type of those classes such that their elements can be put in

[3] "Grundlagen einer allgemeinen Mannigfaltigkeitslehre," Leipzig, 1883, p. 33.

one-one correspondence with a part of themselves, and we have a cardinal number of an infinite class, analogous to the definition of the cardinal number of a finite class. It is unquestionable that there exist such classes of similar classes, and that therefore this cardinal number has some meaning. Furthermore, there appear to be infinite classes which do not have the same cardinal number, for whereas the collection of finite numbers and the collection of all the points in space can each be put in one-one correspondence with a part of itself, no one has yet succeeded in putting them in one-one correspondence with each other, and Cantor has proofs, which have not been refuted, that it can not be done. Granting, then, that different transfinite cardinal numbers, in some sense, exist, a very interesting situation is found, for there is no proof that these different numbers can be ordered in a linear series, *i. e.*, that they are analogous to the finite numbers in being distinguishable for the purpose of counting. To be sure, Cantor can prove that when any class is given, a class can be constructed that shall have a greater cardinal number than the given class. That might mean, however, that the two "growing" processes are so related that one must always be in advance of the other. An illustration of this theorem by Professor Huntington[4] points quite definitely to this interpretation. "For example, let C denote the class of elements in a linear continuum, say, the class of points on a line one inch long; and let C' denote the class of all possible 'bi-colored rods' which can be constructed by painting each point of the given line either red or blue. Then the class of rods C' has a higher cardinal number than the class of points C, as may be proved as follows: In the first place, *C is equivalent to a part of C';* for example, to the class of rods in which one point is painted red and all the other points blue. Secondly, *C is not equivalent to the whole of C';* for, if any alleged one-one correspondence between the rods and the points were proposed, we could at once define a rod which would not be included in the scheme: namely, the rod in which the color of each point x is opposite to the color of the point x in the rod which is assigned to the point x of the given line; this rod would differ from each rod of the proposed scheme in the color of at least one point." In other words, one scheme of "growth" is imposed on another in such a fashion that the combined result is always in advance of that logically given with the first, and the misinterpretation of this as meaning that the second collection is greater than the first arises from carrying over to the transfinite a connotation true only of the finite, namely, that the elements of the class are given statically, a thing which our examination of the definition of infinity showed us is logically impossible. "To be given" has an ambiguity in mean-

[4] Huntington, "Annals of Mathematics," 2d series, Vol. 7, 1905, p. 39.

ing, and the new concept is not "in determinate relations, fixed by definitions, to the conceptions already present and verified." Have we, then, a right to call these new types numbers?

The illusion that we have this right is strengthened by the fact that Cantor develops his theory in close connection with the concept of series, although it is understood that the cardinal number here is the "cardinal number of the *class of elements which occur in the series,* without regard to their order."[5] Different types of series are definable, and it is possible to order some of these types of series.[6] Also, there will be a cardinal number of the elements of these ordered series of series. But the very fact that the transfinite numbers are dependent for definition on series of series, while vouching for their possibility in some sense, also points to the explanation of them given above as due to the superimposition of process on process.

It is hard for the mathematician to see it this way. To him, the objection is insuperable that all the elements of a transfinite collection are given when the collection is defined, and all the points of a line are given when the line is given. To deny this seems to him absurd. Yet the denial is possible when we get rid of the ambiguity of the word *given.* Suppose a line, and there is a possibility of finding as many points as you please. The line is infinitely pregnant with points, it is analyzable into points, but *it can not be synthetically constructed of points.* If it were, the points would be given in the assumed sense of *given,* which, with Locke, we believe to be invalid. The linear continuum can be mathematically defined, and it gives us such a method of analyzing a line into points that no other process of analyzing it shall be continually in advance of this one, and so seem to give us more points. We have, then, practically reduced the line to points, but it is the error specified by Locke to consider these points as statically given.

On the basis of these considerations, it is evident that the most that can be meant by Cantor's transfinite numbers is that, given an open process, the type of infinity, it is possible to define a modification of this process through elements related to the elements originally implied in such fashion that the combined implication of these processes shall be essentially non-equivalent to the implication of the original process. But this does not guarantee that there are more elements in the one case than in the other, any more than the fact that to correlate a set of things by painting them both red and green, which involves the putting on of one color before the other and so double work, means that there are more things than there would have been had they been merely painted green, or than the fact that the

[5] Huntington, *loc. cit.,* p. 40.

[6] *Cf.* Huntington, *loc. cit.,* p. 35

kitten fails to catch its tail means that the tail goes faster than the cat.

And this brings us back to our starting place. A cardinal number is not merely the name of a correlation process, but it is the name of a closed correlation process applied to elements that are logically possible together. In giving up these two essential connotations the transfinite loses a part of the essence of number and has no claim to the name unless we wish to use the name *cardinal number* for different sorts of arrangements of elements, or, in other words, for qualitatively different collections.

If the analysis of this paper is correct, mathematicians have committed the fallacy of converse accident in their generalization of the concept of number, and only the finite numbers are legitimate. Such success as has been attained must, therefore, be explained through the correctness of a limited aspect of the theory of the transfinite, *i. e.*, the study of the relations of ordinal types. The difficulties of the theory, a most marvelous budget of paradoxes, vanish under such limitations. In fact, some such limitation has already been suggested for this very reason, although explanation of it, other than the need of avoiding contradiction, has not been given.[7] However, the scope of this paper will not permit us to touch upon the paradoxes of the transfinite.

HAROLD CHAPMAN BROWN.

COLUMBIA UNIVERSITY.

DISCUSSION

ULTIMATE HYPOTHESES IN PSYCHOLOGY

IN his very interesting discussion of "ultimate hypotheses in psychology," published in this JOURNAL August 13, Professor Tawney seems to me to overstate the divergence of my view from his. His teaching (in an earlier paper,[1] which, however, he here cites with approval) that self-awareness is a constituent of all consciousness is, I think, the essence of my contention that the self is basal fact of all consciousness (and not merely of consciousness at its higher levels). In the paper just published in this JOURNAL Dr. Tawney makes this "vague self-awareness . . . identical with the immediate experience of value." I question the expediency of the identification, but this may be a difference of terminology only.

In comment upon Dr. Tawney's criticisms of my conception, I have two points to urge. In the first place, I wish that he would

[7] *Cf.* B. Russell, *Proceedings of the London Mathematical Society*, Series 2, Vol. IV., Part 1, pp. 29–53.

[1] "Feeling and Self-awareness," *Psychological Review*, Vol. IX., pp. 570 ff.

argue in detail and with reference to concrete conscious experiences, instead of implying, without argument, that the conception of self has no "descriptive value . . . in dealing with perception, or impulse, or any other special topic of psychology." That is, I wish that he would argue the erroneousness of my teaching that will and emotion are not adequately described except as including the consciousness of uniqueness; that recognition includes consciousness of persistence; that will and faith must be regarded as consciousness of activity; and that even perception is incompletely distinguished from other experiences unless it is conceived as passive and as sharable consciousness. My claim is precisely that psychology when it is purely structural, and even when it deals with abstract functions—when, in a word, it consistently rules out reference to the relatedness, the persistence, the activity, and the passivity of the conscious self—gives us inadequate description. I wish that these specific applications of my general doctrine might receive criticism.[2]

There remains Tawney's emphatic assertion that "the persistence, inclusiveness, relatedness [why omit the 'uniqueness'?] of the . . . self are not immediate." In the end this is, of course, a case of opposition between my introspection and my critic's, and as such is removed from the sphere of argument. I still believe, however, that there is no warrant for denying the immediate awareness, in all consciousness, of a self unique, persistent, and related. I am convinced that the denial is made solely because of the needless and misleading assumption that the immediate realization of oneself is identical with a discriminating, reflective thought about oneself. Of course, such reflective consciousness of self is characteristic of complex experiences only; but a dim, vague, yet none the less real, awareness of self is the very warp and woof of consciousness.

May I suggest, in conclusion, that the difference between my view and Dr. Tawney's is due, perhaps, to an overemphasis of the analogy between the object of psychology and the object of the other sciences? Psychology is science, not philosophy, first because it is concerned with facts as such, and second because, like other sciences, it deals with an intentionally limited group of facts which it accepts without puzzling about the further irreducible nature of them. In both these ways the object of psychology resembles the object of the other sciences. But the resemblance should not blind us to a real contrast. In the non-psychological sciences I study the objects of my consciousness, thus implicitly conceiving consciousness as subject. As a psychologist, on the other hand, I must recognize without

[2] Professor M. F. Washburn offered in this JOURNAL (Vol. II., p. 715) such a criticism of my theory of emotion, and Dr. Tawney cites it. I have tried (this JOURNAL, Vol. V., p. 121) to meet the criticism.

attempting, philosophically, to explain the fact that consciousness is both subject and object—that I am conscious of myself as conscious. Thus, it is altogether likely that the object of psychology must receive treatment unlike that meted out to the physicist's object. Does not Professor Tawney run a risk of ignoring a real distinction if he confines psychology too closely to the categories of the physical sciences?

MARY WHITON CALKINS.

WELLESLEY COLLEGE.

REVIEWS AND ABSTRACTS OF LITERATURE

Ethics. JOHN DEWEY and JAMES H. TUFTS. New York: Henry Holt & Co. 1908. Pp. xiii + 618.

If this is not the ideal text-book in ethics for which we have been waiting so many years, it is, at least, a very good substitute for it. Certainly no more valuable fruit of the recent ethical revival has been produced than this, nor one which will itself produce more future good, for it is bound to be but the first of a new type of texts. It marks the end of the abstract, speculative treatises and the beginning of the positive studies of established human values. The moral life is presented as a reality about which there can be no more question than about the reality of the physical life, and, indeed, as that in which the latter finds its completion and explanation. Theories and systems are strictly subordinated to the facts and are not presented until the facts are clearly given. No student can rise from the study of this book feeling that he has been engaged with questions of purely academic interest. On the contrary, he can not but realize that it is the origin and solution of the problems of his own life with which he is here concerned. Reality is the dominant note of the book.

To produce this effect the genetic method and the new materials furnished by economics and sociology have been freely used. In the first of the three main divisions of the book we have a sketch, somewhat needlessly detailed and perhaps complex, of the development from group action to reflective morality and of the most important factors in the process. As illustrating this, outlines of the Hebrew, Greek, and modern developments are given, the last of which presents excellent material for discussion. A final chapter brings out the continuities and contrasts of primitive group action and individual morality, together with a suggestion of the vices and problems arising from the development.

Part II., which is Mr. Dewey's contribution to the work, contains the analysis and interpretation of the reflective moral life, the growth of which Part I. has traced. The first three chapters discuss the moral situation, in which the individual is compelled to choose consciously between conflicting ends: the problems which arise for practise and theory as a result of such choice: and the types of ethical theory based upon

varying emphasis on the elements in the moral choice. Especially valuable for the student here is this correlation between psychological analysis of voluntary conduct and the types of ethical theory. There follows next an extremely lucid discussion, reminding one more strongly of the author's earlier, than of his later, writings, of the main problems in the theory of morals. Throughout, the evident purpose to avoid abstractness and realize concreteness and wholeness is attained. Indeed, in the discussion of the relation between subjective and objective morality the statement of the identity of the two is so absolute as to lead to misunderstanding without further qualification. Only if we take an action in its relation to the total foreseen results and rigidly rule out extraneous effects can we even in faith say, "the mixture of good and evil in the results and the mixture of good and evil in the motives are proportionate to each other" (p. 260). These qualifications are implied apparently, but the total impression is misleading.

It is not necessary to outline the author's naturalistic idealism. It is John Stuart Mill's philosophy of life freed from the illogical hedonism which Mill thought was its basis and stated in the light of the theory of evolution. The good is happiness, and happiness consists, not in the attainment of pleasure, but "in the agreement, whether anticipated or realized, of the objective conditions brought about by our endeavors with our desires and purposes" (p. 281). This realization of ends, moreover, is not a random process, a seeking of any and every pleasure, but the development of an organic system of life. Pleasures differ in quality according to the nature of their implied conditions, so that in the interests of a larger and more inclusive self it is often necessary to choose the lesser but better pleasure. This means that the complete good of man must be a social good and that he must seek this good, not because he himself will get most pleasure therefrom, but because he is a social being the development of whose nature is possible only through society. The common life is thus not a means to his individual good, but is itself his good. The old virtue and happiness problem is thrust aside as ethically unmeaning. "The identity of individual and general happiness is a *moral* matter; it depends, that is, upon the reflective and intentional development of that type of character which identifies itself with common ends, and which is happy in these ends just because it has made them its own" (p. 302). Hence, too, the need of moral democracy in social effort. "The vice of the social leader, of the reformer, of the philanthropist and the specialist in every worthy cause of science, or art, or politics, is to seek ends which promote the social welfare in ways which fail to engage the active interest and cooperation of others. . . . But in truth a common end which is not made such by common, free, voluntary cooperation in process of achievement is such in name only. It has no support and guarantee in the activities which it is supposed to benefit, because it is not the fruit of those activities. . . . There is no way to escape or evade this law of happiness, that it resides in the exercise of the active capacities of a voluntary agent; and hence no way to escape or

evade the law of a common happiness, that it must reside in the congruous exercise of the voluntary activities of all concerned. The inherent irony and tragedy of much that passes for a high kind of socialized activity is precisely that it seeks a common good by methods which forbid its being either common or a good" (pp. 303, 304). The author's summary of his doctrine can not be better put: "Our final word about the place of the self in the moral life is, then, that the problem of morality is the formation, out of the body of original instinctive impulses which compose the natural self, of a voluntary self in which socialized desires and affections are dominant, and in which the last and controlling principle of deliberation is the love of the objects which will make this transformation possible. If we identify, as we must do, the interests of such a character with the virtues, we may say with Spinoza that happiness is not the reward of virtue, but is virtue itself" (p. 397).

Part III., which is mainly the work of Mr. Tufts, is a statement of principles and a discussion of problems in the political, economic, and domestic orders. It is here that we are to look for the exemplification and verification of the principles suggested in the earlier portions of the book, and it is here that the average student of ethics will find most of value, or, at least, will find that which gives to the whole its unique value, for it is here that he finds the practical help for which the average student approaches ethics. The problems are all live problems, and the democratic principle of determination is applied with a singular persistence and definiteness. The problems are not all solved, yet at least we are not left with mere glittering and dazzling generalities, but are given some definite insight into what is implied to-day in the promotion of the common good through the free cooperation of individuals.

Judging the book as it demands, as a text-book, there are a few points which seem unsatisfactory. The first chapter, on the definition and method of ethics, is not only inadequate, but misleading. It is quite true that former texts have almost invariably overelaborated this preliminary matter, but to dispose of the whole problem of normative sciences and their method by the statement that ethics "has to study the inner process as determined by the outer conditions or as changing these outer conditions, and the outward behavior or institution as determined by the inner purpose, or as affecting the inner life," is surely insufficient. The implication is that ethics is a science of like nature and method with psychology and sociology, but concerned with the relation of the agent to his social environment, yet we find the further statement, "to study choice and purpose is psychology; to study choice as affected by the rights of others and to *judge it as right or wrong* by this standard is ethics" (p. 3, italics mine). This task of judging conduct as right or wrong is interesting enough to demand much further explanation. Certainly the scope even of this text-book is not satisfactorily stated.

Again, not only wearied teachers, but eager students, will miss the absence of any complete discussion of freedom. Such discussion in the past has been oversubtle and metaphysical, tending to confuse or edify

rather than enlighten, yet this can hardly justify the omission of the metaphysical altogether and the restriction to the social, economic, and legal aspects of the subject. The question is in the air and demands a thorough analysis to determine its really significant bearings.

And, finally, there is one other point which may seem a sin of omission in the eyes of some. In the description of the ideal life the more mystic traits fail to receive due consideration. This is perhaps due to the very excellence of the book as practical and common sense in all its positions, and yet that mystic life has been a persistent type from the days of the Greeks to our own times and its peculiar blessedness is intense and interesting enough for detailed consideration. To men of this type the democratic social good of our authors might seem a lower and uninteresting ideal.

But these perhaps inevitable omissions can weigh little against the general utility of the work both as to form and content. The references are abundant and interesting, the index and table of contents adequate, and the style fresh and vigorous. It should appeal not only to the special student of ethics, but to those in economics, politics, and sociology as well.

NORMAN WILDE.

UNIVERSITY OF MINNESOTA.

The Application of Statistical Methods to the Problems of Psychophysics. F. M. URBAN. Philadelphia: The Psychological Clinic Press. 1908. Pp. 221.

This book covers three topics: a description of the author's experiments on judging lifted weights; an exposition of certain methods of applying the calculus of probabilities to psychological experiments; and a discussion of the metaphysical implications of the treatment of methods.

Finding from experiment that there was no difference of stimuli which would always be judged the same suggested that here was the empirical realization of underlying probabilities of judgments of certain kinds, and hence that the calculus of probabilities is applicable. This concept is first applied to the understanding of a cause, which is defined (p. 20) as "a group of conditions which gives a certain probability to the event." Whether variation in the results of an experiment is due to change in the controlled elements in this group of conditions or to change in the chance elements may be determined by comparing the results with the probability integral.

The second application of the concept of probability is to the method of finding the threshold of sensation. The threshold in the direction of increase of stimulus is defined as that amount of difference for which there is one chance out of two that a judgment "greater" will be given (p. 69). The method based on this definition makes it possible to avoid the disturbance due to expectation by presenting the stimuli in irregular order, without resorting to the so-called error methods for computing

results. As had been shown previously, these error methods rule out the notion of threshold in any absolute sense, for they assume that the size of the just perceptible difference depends on the number of observations, and thus that theoretically there is no difference which can not sometimes be just perceptible. Furthermore, the author holds that his definition makes unnecessary the notion of sensational elements, the threshold being merely a difference possessing a certain probability of having a certain judgment passed upon it.

A third application of the concept of probability is made in developing the notion of psychometric functions, "the functions which give the dependence of the probabilities of the judgments on the differences of the stimuli" (p. 106). By supposing these functions to be analytic, finding them regular in the region of the threshold, and interpolating in this part of their course, values of probabilities for stimuli not actually tried are found. Thus the psychometric functions give a new method of computing the threshold and a method of comparing the point of subjective equality in different subjects. This point is found to be where the psychometric function of the judgments "equal" reaches its maximum. The author uses his experiments to illustrate step by step all three of his applications of the concept of probability.

To the reader with metaphysical interests the last chapter will be most suggestive. In this the author considers the relation of mental and physical facts in general. He maintains that mental phenomena tend to drop out of scientific discussion because of the use of the category of substance and the difficulties involved therein. He suggests that the category of relation avoids these difficulties. The most general form of a relation is that of a non-uniform, discontinuous function, but since a description with such functions can not be exhaustive, science restricts itself to uniform, continuous, analytic functions. In reply to the Moscow school of idealists, who hold that the existence of chance events and "half-analytic" functions shows that some events are not causally necessitated, it is pointed out that the randomness of such events is due to excessive complication of causes, and thus the calculus of probability is an argument, not for the lack of causality, but for uniform causality. The author finds that most arguments that the relation of mental and physical facts is an analytic function have assumed too much. They have gone as follows: There is a relation between the series of mental events and the moments of time; there is a relation—supposed by physics to be expressible in an analytic function—between the series of physical events and the moments of time; therefore, the relation between mental events and physical events is expressible in an analytic function. This argument either begs the question or is erroneous, because, unless the relation between mental events and the moments of time is an analytic function, which is the point at issue, it argues that the combination of an analytic and a non-analytic function gives an analytic function, which is not true. Dr. Urban disclaims any position as to the nature of the relation of mental and physical facts, but points out that the psycho-

metric function, serving as the basis for an infinity of statements from a finite number of observations, is supposed to be analytic.

Dr. Urban's treatment of the application of the theory of probability to psychophysical experiments is a satisfying step toward exactness. Thus, to the question "What difference is just perceptible?" he adds the question "Just perceptible how often?" He has shown new ways in which the mathematical handling of the notion of probability may supplement actual experiment. When, however, we come to his treatment of the epistemological implications of his work we find it hard always to connect his experimental results with his metaphysical discussion. Thus, if he has merely shown that empirical data from psychophysical experiments may be subjected to a process of idealization like that used for physical observations, we can not feel that he has taken us very far. If his result is to show that as the difference in stimuli increases the probability that this difference will be recognized increases, we are grateful for making exact a result of common experience. If, as the careful discussion of the relation of mental and physical facts would seem to indicate, we are to infer that the nature of the relation involved in the psychometric function may some time give us a hint of the nature of the relation of mental and physical states, it seems that the psychometric function will be extremely useful in itself, but will not supply the epistemological relief indicated. The psychometric function shows the relation of the probability of certain judgments to the stimuli. The judgments are the result of a group of causes composed of the stimuli and the psychophysical condition of the subject. A function which shows the relation of the predictability of this result to one factor in the group of causes is valuable in itself, but can it throw much light on the relation of causes within the group, on the relation of the stimulus to the psychophysical condition of the subject?

ROWLAND HAYNES.

UNIVERSITY OF MINNESOTA.

JOURNALS AND NEW BOOKS

ZEITSCHRIFT FUR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. May 5, 1908, Bd. 47, Heft 3. *Abteilung für Psychologie. Untersuchungen über die Temperatursinne* (pp. 161–202): SYDNEY ABRUTZ. – First part of the report of an investigation of some of the still unsettled questions in the psychology of temperature sensations. The reaction times to the paradoxical cold sensation and the sensation of heat are found to be identical, and about twice as long as the reaction time to the sensation of warmth. The reaction time to heat, for the same stimulus (+ 50° C.), varies with the skin area. Reaction time to heat on a given area decreases with increase of the intensity of the stimulus. The absolute stimulus limen for heat varies directly with the local skin temperature, the relative limen becoming lower as the skin

becomes adapted to higher temperatures, though even with constant skin temperature the relative limen varies somewhat with the area. About the lips and oral cavity the absolute stimulus limens for warmth, heat, and pain are lowest on the under lip. Only the lips and their mucus yield clear sensations of warmth. At other points it is difficult to detect warmth before the heat limen is reached. Up to a certain limit, at least, the limen for the paradoxical cold sensation increases with the local temperature of the cold spots. All the evidence tends to confirm Thunberg's statement that the sensation of heat results from the simultaneous stimulation of warm and cold spots. *Meine Theorie der Stroboskopischen Taüschungen und Karl Marbe* (pp. 203–219): PAUL LINKE.—A controversial article, criticizing Marbe's theory of the stroboscopic illusion as dependent on Talbot's law. *Literaturbericht:* J. J. Biervliet, *La psychologie quantitative:* A. KOWALEWSKI. Joseph Jastrow, *The Subconscious:* K. OESTERREICH. A. M. Bodkin, *The Subconscious Factors of Mental Process Considered in Relation to Thought:* HERBERTZ. Le Dantec, *Méthodes artificielles et naturelles:* A. KOWALEWSKI. P. Kronthal, *Konstruktionsprinzipien des Nervensystems:* WARNCKE. W. Waldeyer, *Über Gehirne menschlicher Zwillings- und Drillingsfrüchte verschiedenen Geschlechts:* WARNCKE. Paul Warncke, *Zur Frage des Gehirngewichts bei den Vögeln:* (*Selbstanzeige.*) H. Strasser, *Anleitung zur Gehirnpräparation:* WARNCKE. E. Fuerst, *Über eine durch Muskeldruck hervorgerufene Akkommodation bei jugendlichen Aphakischen:* W. A. NAGEL. J. Rosmanit, *Zur Farbensinnprüfung im Eisenbahn- und Marinedienste;* R. Zeitlmann, *Der Farbensinn und seine Störungen:* W. A. NAGEL. J. Bernstein, *Eine neue Theorie der Farbenempfindung:* W. A. NAGEL. F. Dimmer, *Lesen bei vertikaler Stellung der Zeilen:* W. A. NAGEL. Geigel, *Die Bedeutung der Ohrmuschel für das Hören:* H. BEYER. J. Breuer, *Über das Gehörorgan der Vögel:* H. BEYER. C. Déguisne, *Die Aufzeichnung von akustischen Schwebungen:* (*Selbstanzeige.*) C. Déguisne u. K. Marbe, *Analogie zwischen Wechselströmen und Schallschwingungen:* (*Selbstanzeige.*) Vittorio Benussi, *Zur experimentellen Analyse des Zeitvergleichs. I. Zeitgröfse und Betonungsgestalt:* D. KATZ. Paul R. Radossawljewitsch, *Das Behalten und Vergessen bei Kindern und Erwachsenen nach experimentellen Untersuchungen:* P. EPHRUSSI. C. Spearman, *An "Economic" Theory of Spatial Perception:* HERBERTZ. B. Leroy, *Nature des hallucinations;* L. Dupuis, *L'hallucination du point de vue psychologique:* KOWALEWSKI. A. Günther, *Ein Vorgang in der Wiedergabe naiver Zeugen und in der Rekonstruktion durch Juristen:* LIPMANN. R. Lagerborg, *Zur Abgrenzung des Gefühlsbegriffs:* GROETHUYSEN.

Adam, James. *The Religious Teachers of Greece. Being Gifford Lectures on Natural Religion delivered at Aberdeen.* Edited, with a memoir, by his wife, Adela Marion Adam. Edinburgh: T. & T. Clark. 1908. Pp. lv + 467.

Coit, Stanton. *National Idealism and the Book of Common Prayer.* London: Williams and Norgate. 1908. Pp. xxv + 467. 10s. 6d. *net.*

Davenport, H. J. *Exercises in Value Theory.* Based upon "Value and Distribution." Chicago: The University of Chicago Press. 1908. Pp. 32. 25 cents.

Del Vecchio, Georgio. *Concetto della natura e il principio del diritto.* Milan, Turin, Rome: Fratelli Bocca. 1908. Pp. 174. 5 L.

Mentré, F. *Cournot et la renaissance du probabilisme au XIX^e siècle.* Bibliothèque de philosophie expérimentale. Paris: Marcel Rivière. 1908. Pp. viii + 649. 12 fr.

Paulsen, Friedrich. *German Education, Past and Present.* English translation by T. Lorenz. London: T. Fisher Unwin. 1908. Pp. xx + 310. 5s. *net.*

Picard, Roger. *La philosophie sociale de Renouvier.* Systèmes et faits sociaux. Paris: Marcel Rivière. 1908. Pp. 344. 7.50 fr.

Royce, Josiah. *Race Questions, Provincialism, and Other American Problems.* New York: The Macmillan Co. Pp. xiii + 287. $1.25 *net.*

NOTES AND NEWS

We take the following from Professor James's contribution to the October *Hibbert Journal* on "Hegel and his Method": "Merely as a reporter of certain aspects of the actual, Hegel is great and true. But he aimed at being something far greater than an empirical reporter, so I must say something about that essential aspect of his thought. Hegel was dominated by the notion of a truth that should prove incontrovertible, binding on every one, and certain, which should be *the* truth, one, indivisible, eternal, objective, and necessary, to which all our particular thinking must lead as to its consummation. This is the dogmatic ideal, the postulate uncriticized, undoubted, and unchallenged, of all rationalizers in philosophy. *'I have never doubted,'* a recent writer says, that truth is universal and single and timeless, a single content or significance, one and whole and complete. (Joachim, 'The Nature of Truth.') Advance in thinking, in the Hegelian universe, has in short to proceed by the words *must be* rather than by the weaker words *may be,* which are all that empiricists can use. Now Hegel found that his idea of an immanent movement through the field of concepts by way of 'dialectic' negation played most beautifully into the hands of this rationalistic demand for something absolute and *inconcussum* in the way of truth. It is easy to see how. If you affirm anything, for example that *A* is, and simply leave the matter thus, you leave it at the mercy of any one who may supervene and say, 'Not *A,* but *B* is.' If he does say so, your statement does not refute him; it simply contradicts him, just as his contradicts you. The only way of *securing* your affirmation about *A* is by getting it into a form which will by implication negate its negation in advance. The mere absence of negation is not enough; it must be present, but present with its fangs drawn; your *A* must not only be an

A, it must be a non-not-*A* as well; it must already have cancelled all the *B's* or made them innocuous by having negated them already. Double negation is thus the only form of affirmation that fully plays into the hands of the dogmatic ideal. Simply and innocently affirmative statements are good enough for empiricists, but unfit for rationalist use, lying open as they do to every accidental contradictor, and exposed to every puff of doubt. The final truth must be something to which there is no imaginable alternative, because it contains all its alternatives inside of itself as moments already taken account of and overcome. It involves its own alternatives as elements of itself, is, in the phrase so often repeated, its own other, made so by the *Methode der absoluten Negativität*. Formally, this scheme of an organism of truth that has already fed as it were on its own liability to death, so that, death once dead for it, there is no more dying then, is the very fulfilment of the rationalistic aspiration. That one and only one whole, with all its parts involved in it, negating and making one another impossible if abstracted and taken singly, but necessitating and holding one another in place if the whole of them be taken integrally, is the literal ideal sought after, it is the very diagram and picture of that notion of *the* truth with no outlying alternative, which so dominates the dogmatic imagination."

WE take the following from *Nature:* "An important essay on logic and the continuum has been contributed to the *Bulletin of the American Mathematical Society* for June by Professor E. B. Wilson, of Boston, U. S. A. It deals largely with Zermelo's proposed solution of the problem, first stated by Professor Georg Cantor in 1883, as to whether every set, and in particular the continuum, can be well ordered. In a postscript the author refers to Schœnflies's report on the same subject. Among Professor Wilson's conclusions, the view is put forward that the well ordering of any set is of practically no significance, and is quite worthless apart from an algorithm which accomplishes the ordering—an algorithm which shall not require an operation which transcends the cardinal number of the given set. This quotation must be regarded as a mere indication of the general character of the questions discussed in the paper."

PROFESSOR WILLIAM JAMES returned on October 16 from Oxford, England, where he had gone to deliver a series of eight lectures on "The Present Position of Philosophy."

DR. DANIEL STARCH, instructor in experimental psychology in Wellesley College, has been appointed instructor in psychology in the University of Wisconsin.

MR. F. C. BECKER, assistant in philosophy in Columbia University, has been appointed instructor in philosophy in the University of Illinois.

MR. E. G. HARTMANN (Columbia) has been appointed instructor in philosophy at Acadia College, Nova Scotia.

DR. ALBERT F. BUCK (Harvard) has been called to the department of philosophy in the University of Vermont.